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H.A.R.E. SQ Negative Tone Photoresist

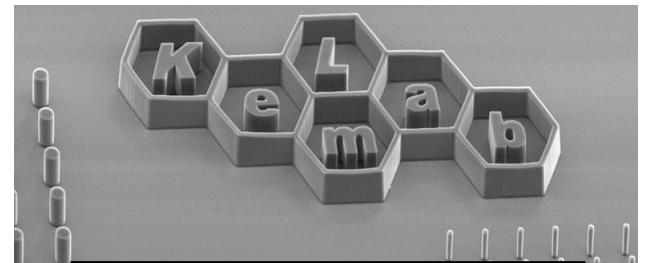
High Aspect Ratio Epoxy / Superior Quality

Description:

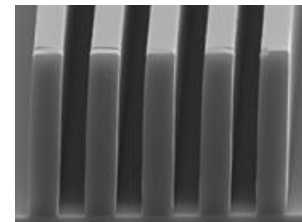
HARE-SQ is an epoxy based negative photoresist designed for polymeric MEMS, microfluidics, micromachining and other microelectronic applications. The HARE-SQ system is designed for use in thick film applications of 2 to 100 microns, and is ideal for use in permanent applications in which the photoresist remains within the finished device.

Advantages:

- The HARE-SQ photoresist uses an epoxy resin with superior cleanliness and excellent reproducibility
- Consistent surface energy of crosslinked resist, (an important property for microfluidic applications).
- Fully compatible with SU-8 processes.



Logo & posts in 50 µm film



5 µm dense line/space in 25 µm film

Process Guide

Product: Film Thickness @ 2000 rpm	SQ-2 2 µm	SQ-5 5 µm	SQ-10 10 µm	SQ-25 25 µm	SQ-50 50 µm
Softbake (2 step)	65°C for 1 min 95°C for 1 min	65°C for 1 min 95°C for 3 min	65°C for 2 min 95°C for 5 min	65°C for 3 min 95°C for 7 min	65°C for 5 min 95°C for 15 min
Expose (broadband) on Si	200 mJ/cm ²	180 mJ/cm ²	180 mJ/cm ²	180 mJ/cm ²	180 mJ/cm ²
Post Exposure Bake (2 step)	65°C for 1 min 95°C for 1 min	65°C for 1 min 95°C for 1 min	65°C for 2 min 95°C for 2 min	65°C for 3 min 95°C for 3 min	65°C for 1 min 95°C for 4 min
Develop (immersion)	1 minute	1 minute	2.5 minutes	3.5 minutes	6 minutes

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Substrate

HARE SQ adheres to variety of substrates; including silicon, gold, aluminum, chromium and copper. Proper substrate cleaning & dehydration improve adhesion.

Coat

Spin Coat: Film Thickness is targeted using the spin speed curve (shown at right). The coat program uses a 5 - 10 second spread cycle. Spin time at final speed is 30 seconds.

Coat techniques such as spray coat, slot coating, and other additive techniques are possible; please contact KemLab for more information.

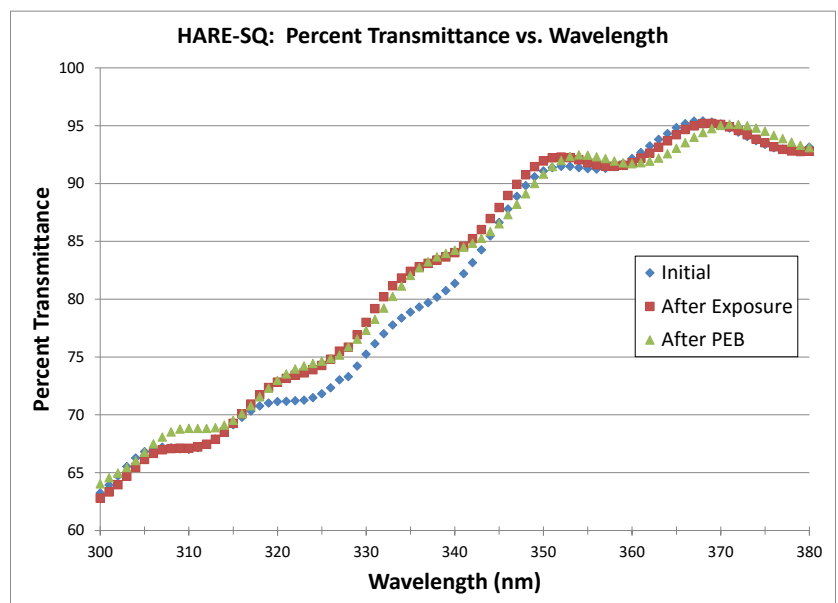
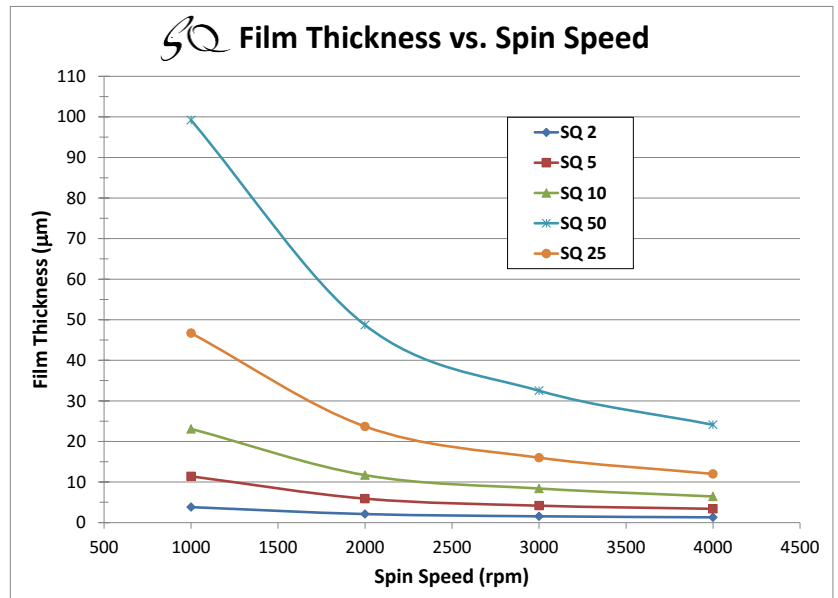
Soft Bake

The recommended softbake for the HARE-SQ utilizes a two-step bake on a contact hot plate in order to minimize film stress and adhesion issues.

See Process Guide Table (front page) for details.

Exposure & Optical Parameters

HARE-SQ is designed for near UV (300-400nm) exposure wavelengths. Exposure dose will vary depending on the exposure tool set, film thickness, and process conditions. Nominal exposure doses are shown in the Process Guide for broadband exposure with a 360nm cutoff filter at the thicknesses and processes shown.



Post-Exposure Bake (PEB)

Recommended PEB time is adjusted according to film thickness in order to ensure sufficient crosslinking of the resist film. A two-step PEB is recommended to reduce film stress which can lead to cracking and/or adhesion loss.

See Process Guide Table for details.

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Develop

HARE-SQ is designed for use with KemLab SQ developer. It can be developed using immersion, puddle or spray puddle. Thicker films benefit from refreshing developer during the develop step; such as with a double puddle.

Rinse developer off substrate with isopropyl alcohol (IPA) & dry.

See Process Guide Table for details.

Hardbake

HARE-SQ can be hardbaked for permanent applications that would benefit from further crosslinking.

Bake at $> 120^{\circ}\text{C}$ for at least 5 minutes (hot plate). A short hardbake can fuse cracks caused by film stress.

For permanent structures, temperatures above 150°C are recommended. Oven bake will increase crosslinking with minimal increase in stress.

Handling & Disposal Considerations

Consult the MSDS for handling and appropriate. HARE-SQ contains a combustible liquid; keep away from ignition sources, heat, sparks and flames.

HARE-SQ is compatible with typical waste streams used with photoresist processing. It is the user's responsibility to dispose in accordance with all local, state, and federal regulations.

The information is based on KemLab's experience and is, to the best of our knowledge, accurate and true. We make no guarantee or warranty, expressed or implied, regarding the information, use, handling, storage, or possession of these products, or the application of any process described herein or the results desired, since the conditions of use and handling of these products are beyond our control.